

# Making Decisions: Learning Objectives

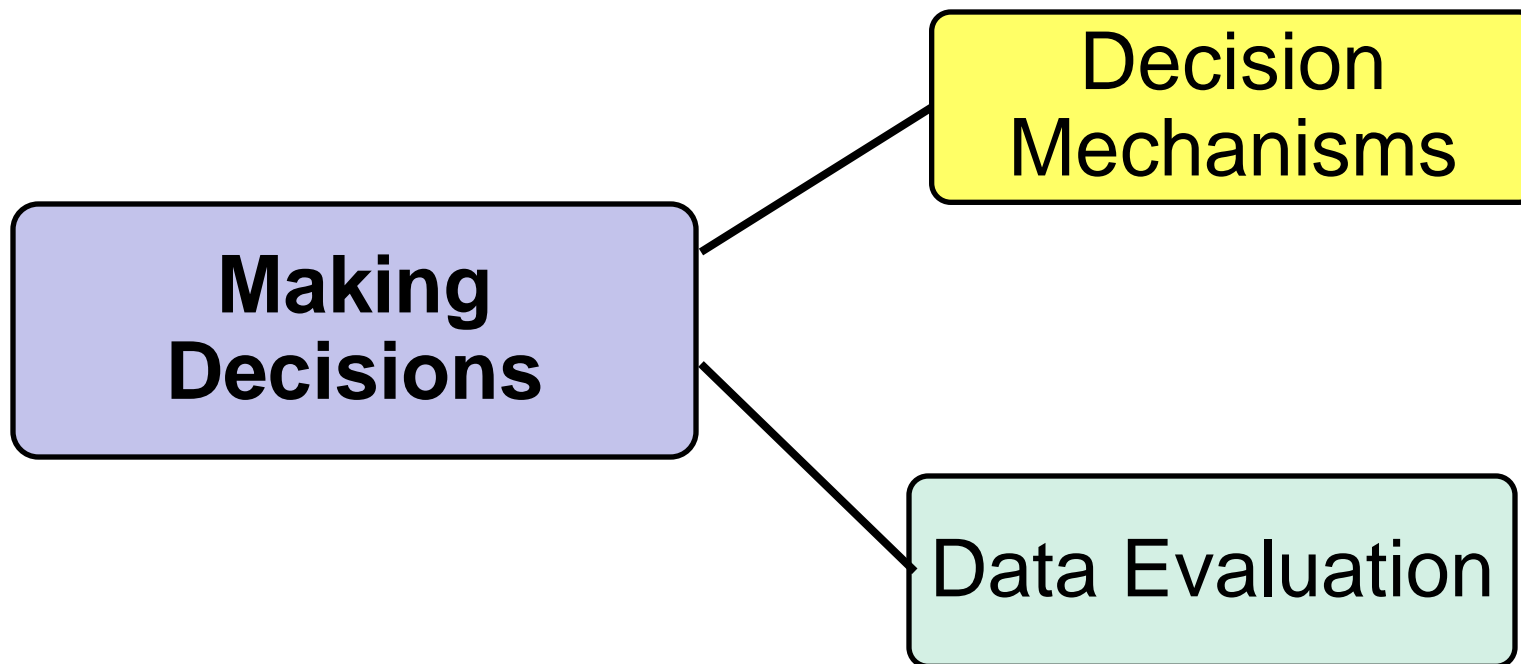
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## Learn how to:

- ▶ Use ISM data to make decisions
- ▶ Evaluate data
  - Identifying sources of error
  - Quantify error
  - Interpret error
  - Isolate sources of error

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# Making Decisions Using ISM Data

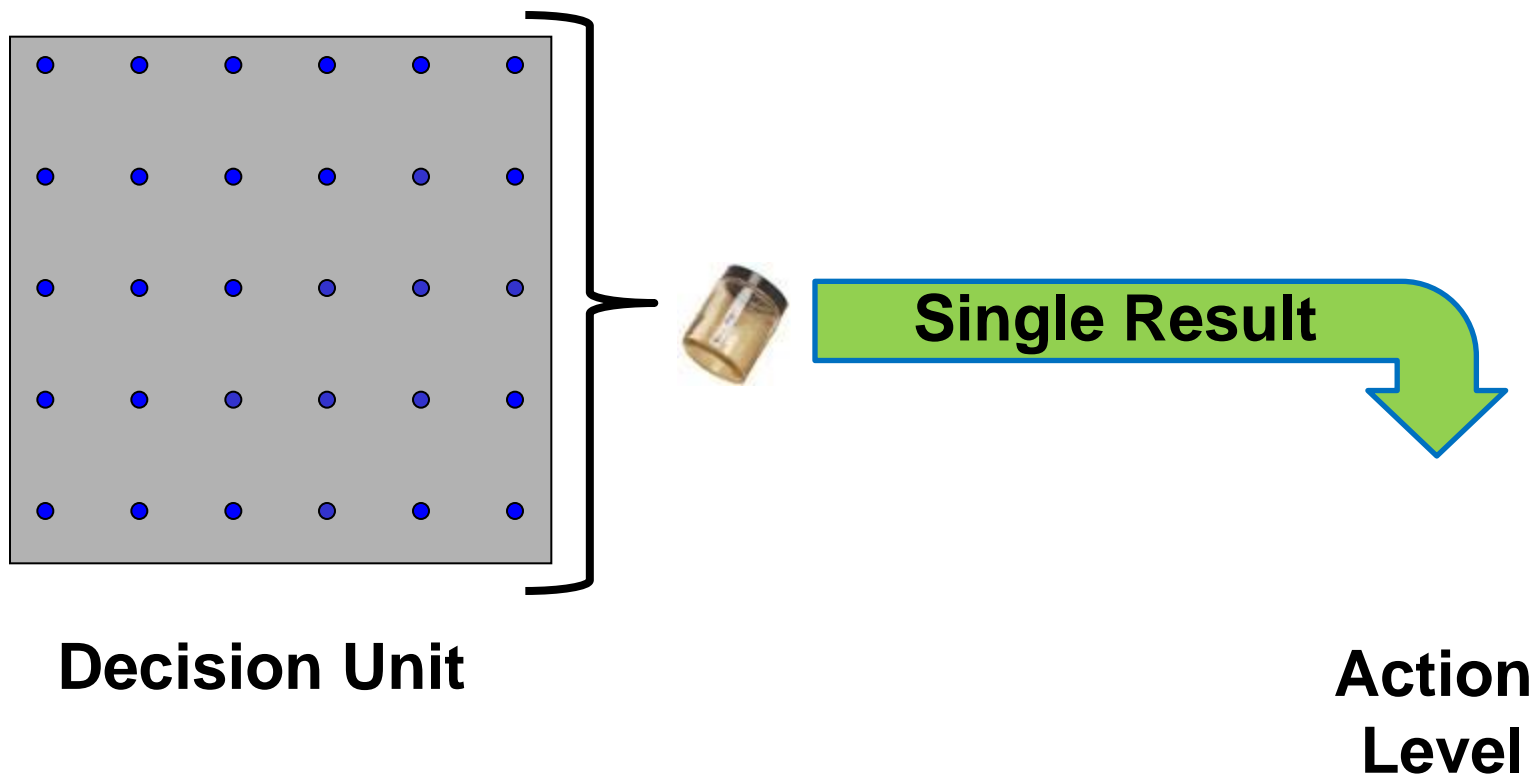


# Making Decisions

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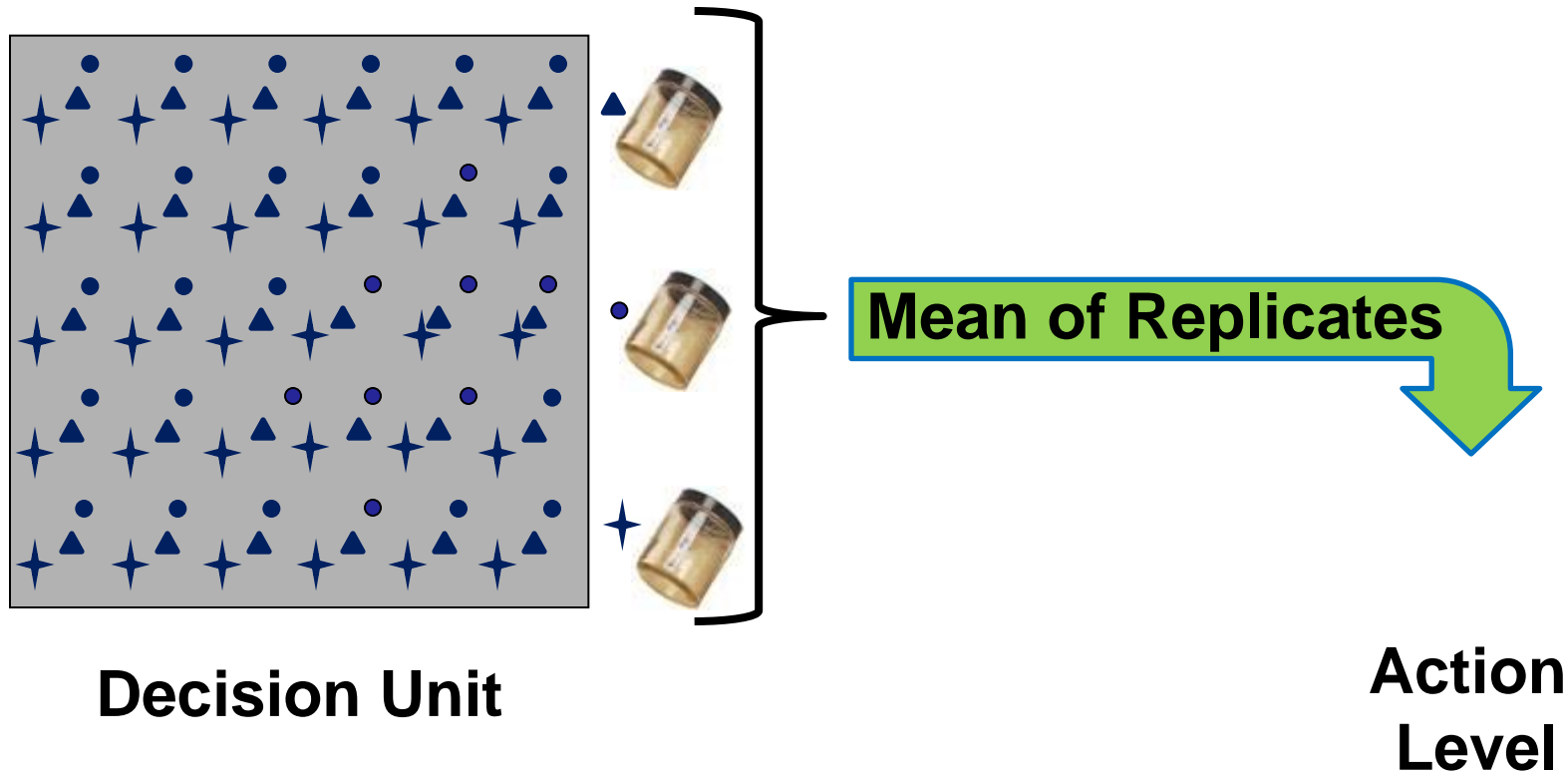
- ▶ Decision Mechanism (DM)
  - Structured approach to making decisions
  - Identified and agreed upon during Data Quality Objective (DQO) process
  - 6 common types of DM

# DM 1: Compare One ISM Result to Action Level



# DM 2: Compare Average ISM Result to Action Level

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# Florida Case Study: Decision Mechanism (DM) 2

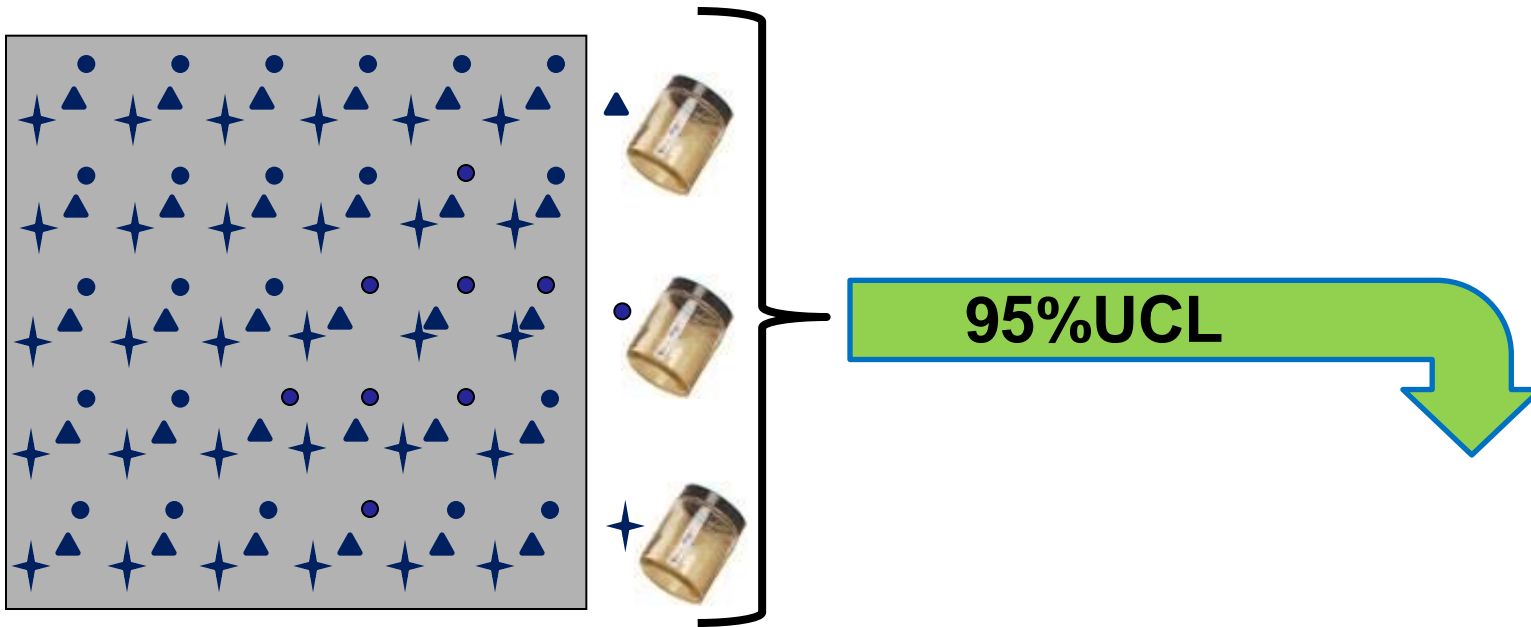
Mean arsenic concentrations (mg/kg)

	<b>Discrete</b> <i>n</i> = 30	<b>Incr-30</b> <i>n</i> = 3	<b>Incr-100</b> <i>n</i> = 3
DU 2	4.2	5	5.2
DU 3	7.5	10.5	9.5



# DM 3: Calculate 95%UCL then Compare to Action Level or Use for Risk Assessment

Decision Unit



Action level  
 or risk assessment



# Florida Case Study: Decision Mechanism 3: (DU 1)

## Arsenic Data (mg/kg)

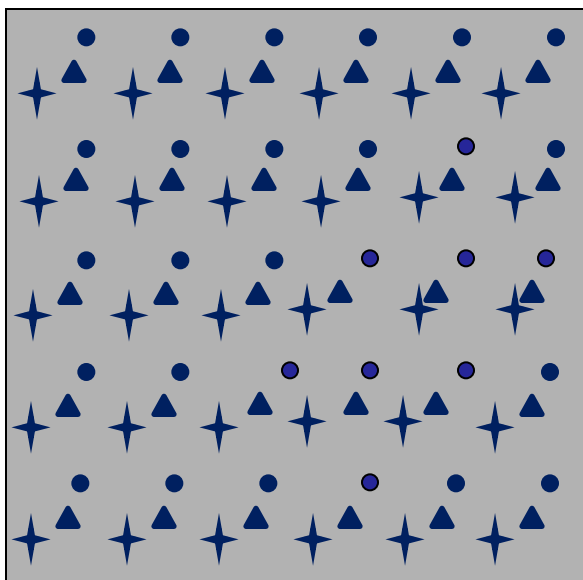
	Discrete n = 10 (mg/kg)	Incr-30 n = 3 (mg/kg)	Incr-100 n = 3 (mg/kg)
Mean	2	1.8	1.7
Std Dev	1.4	0.08	0.03
<b>95UCL</b>	<b>3.0</b>	<b>2.0</b>	<b>1.8</b>

Florida Action Level: 2.1 mg/kg

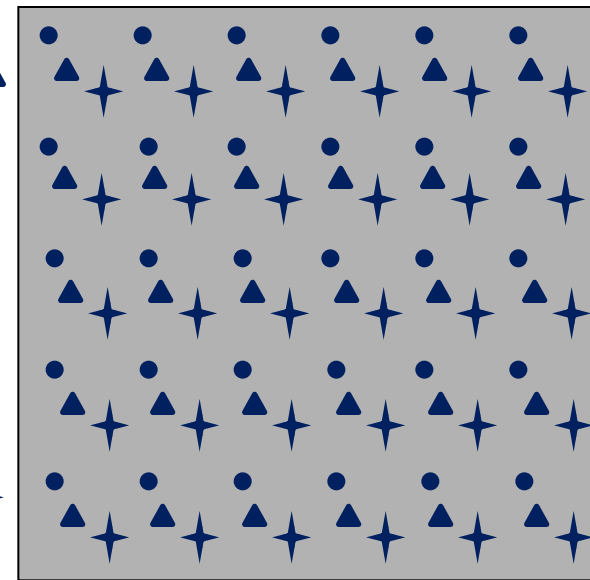


# DM 4: Compare to Background

## Decision Unit



## Background

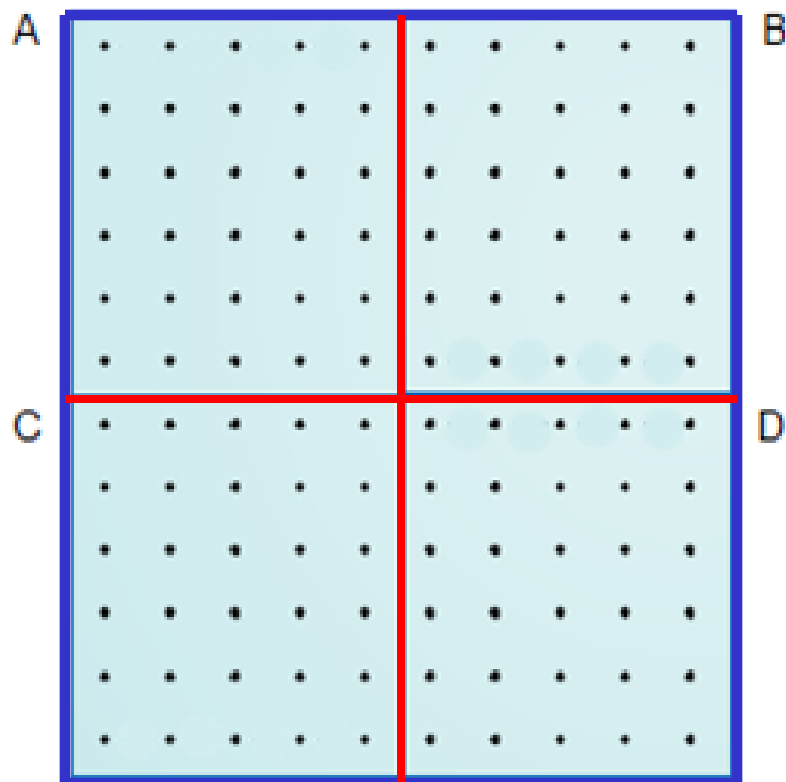


Mean & S.D.

Mean & S.D.

Comparison

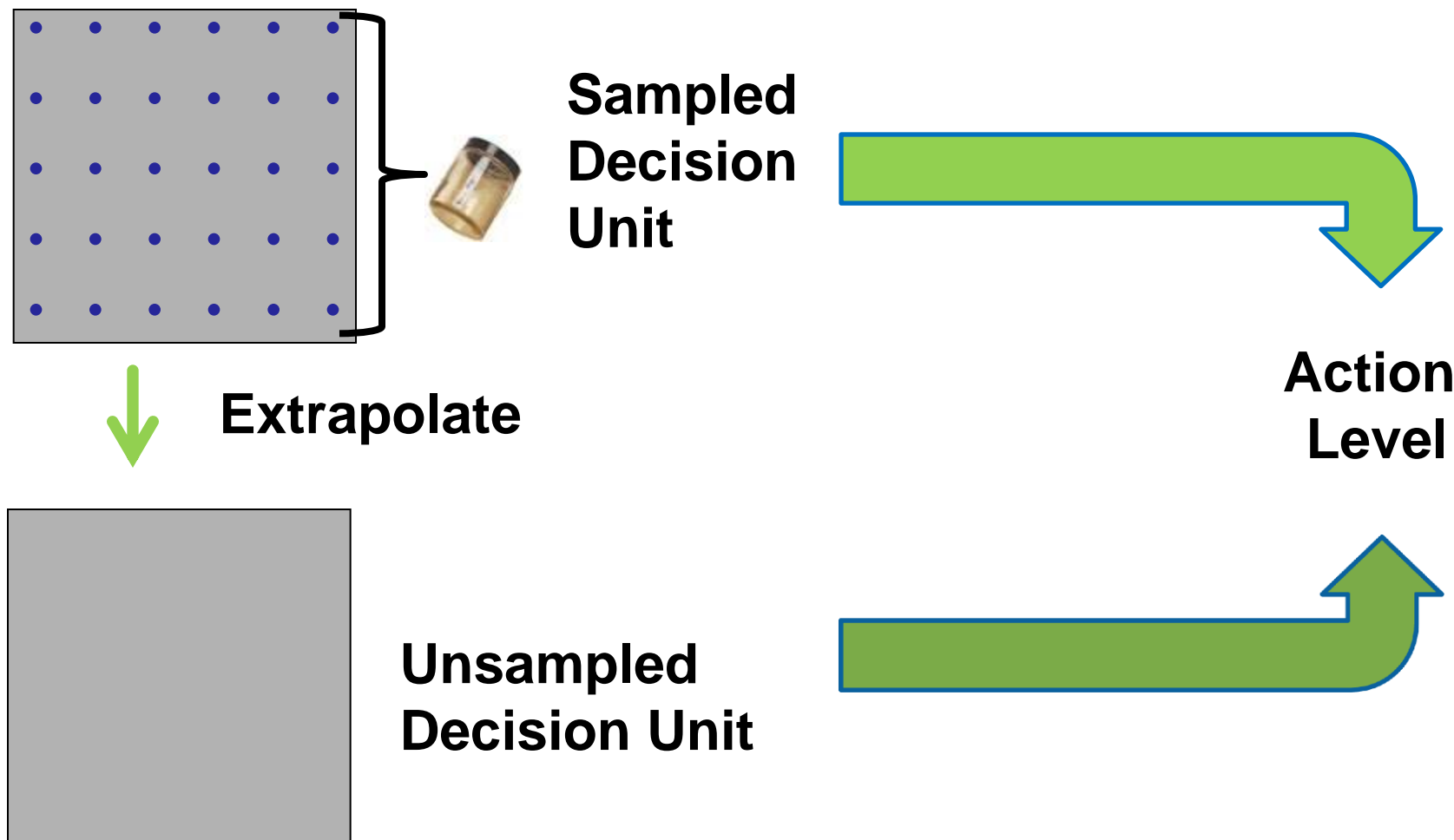
# DM 5: Combining Decision Units



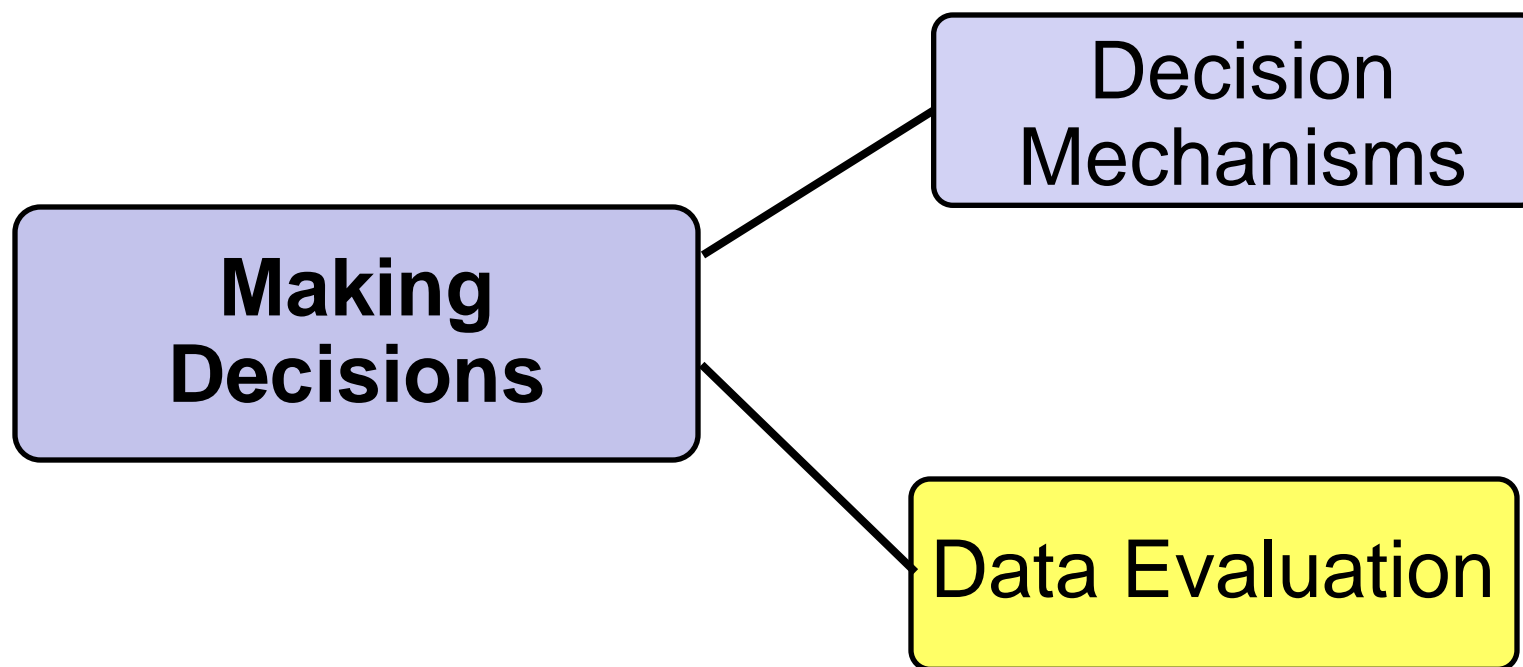
**DU average  
and  
Weighted average**

**Action Level**

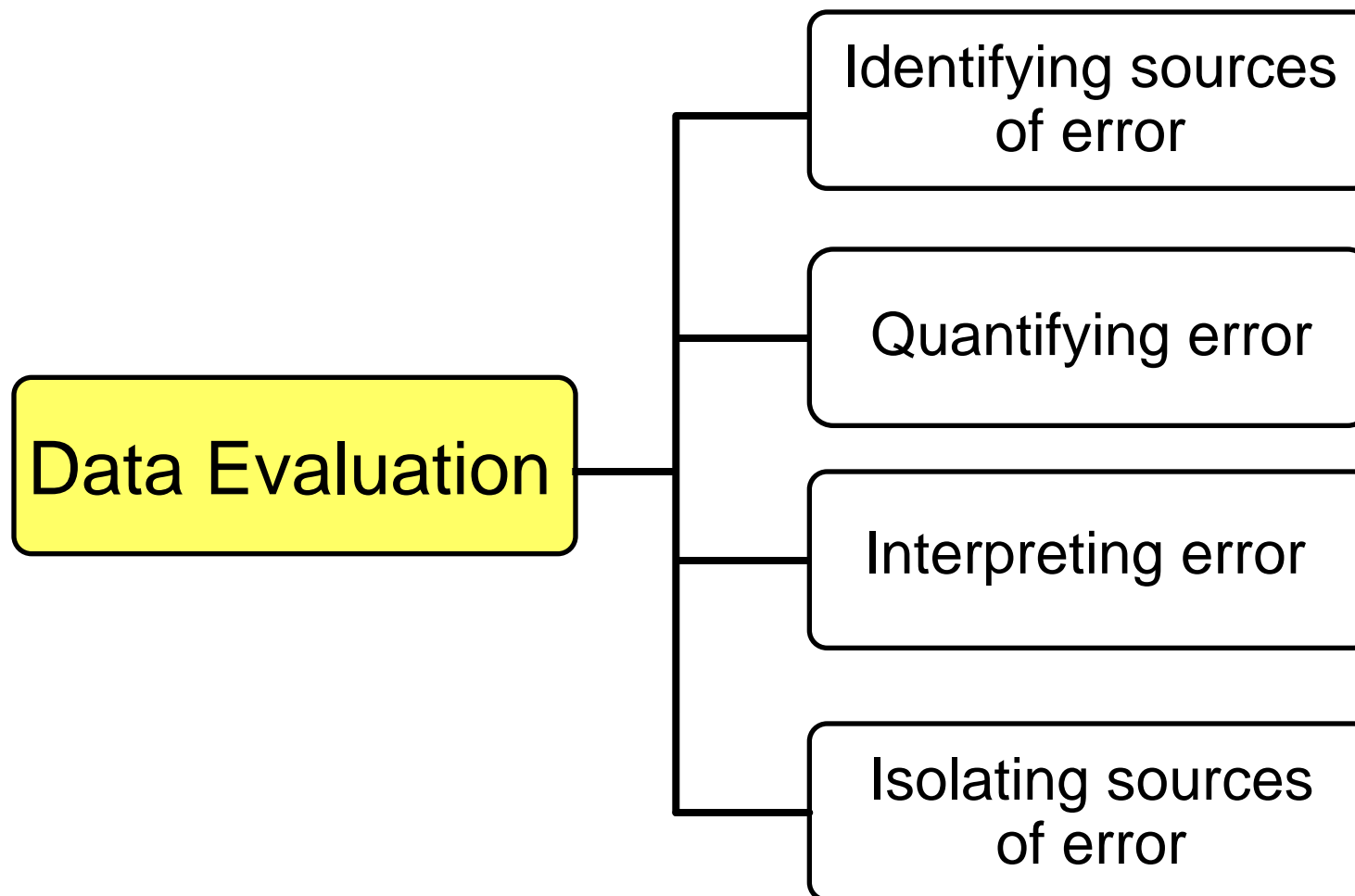
# DM 6: Extrapolation to Unsampled Areas



# Making Decisions Using ISM Data



# Data Evaluation Components



# Identifying Sources of Error

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## Field

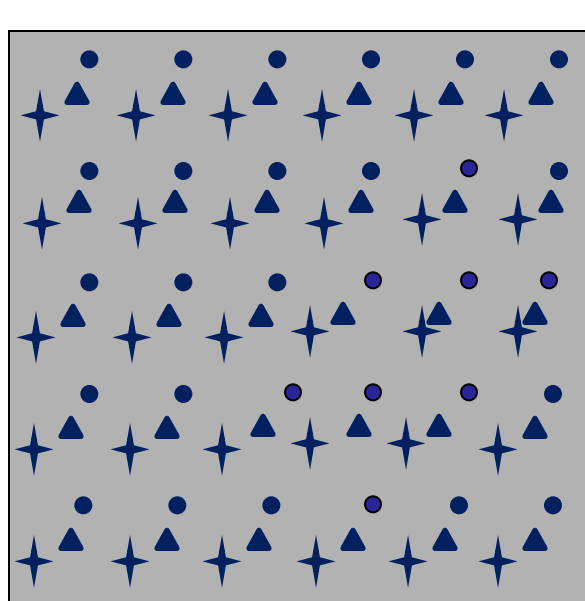
- ▶ Number of increments
- ▶ Increment collection
- ▶ Field processing
- ▶ Field splitting
- ▶ DU size and shape

## Laboratory

- ▶ Lab processing
- ▶ Subsampling
- ▶ Extraction
- ▶ Digestion
- ▶ Analysis

# Quantifying Error

$RSD = CV = \text{standard deviation} / \text{arithmetic mean}$



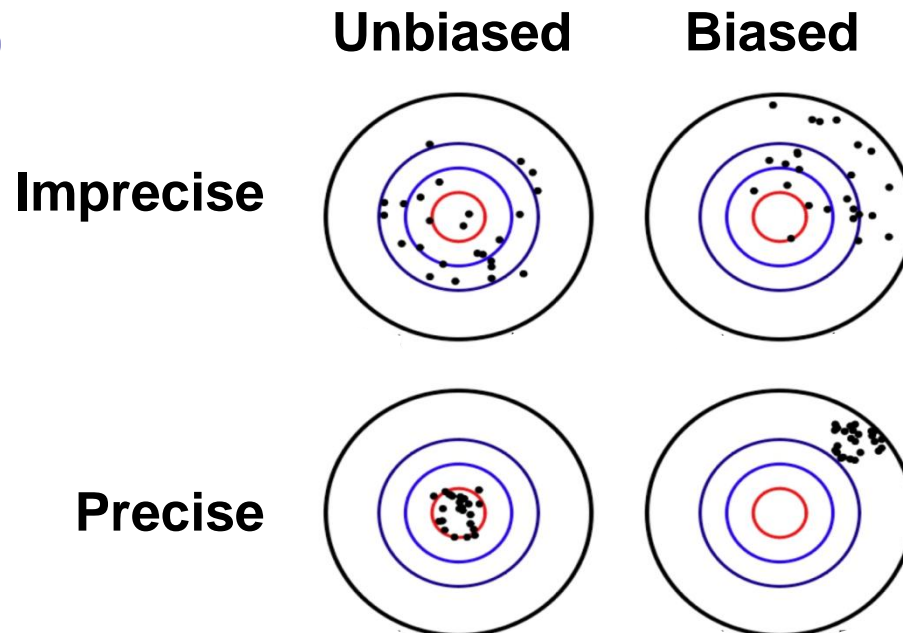
**Decision Unit**

**Data includes all  
sources of error**

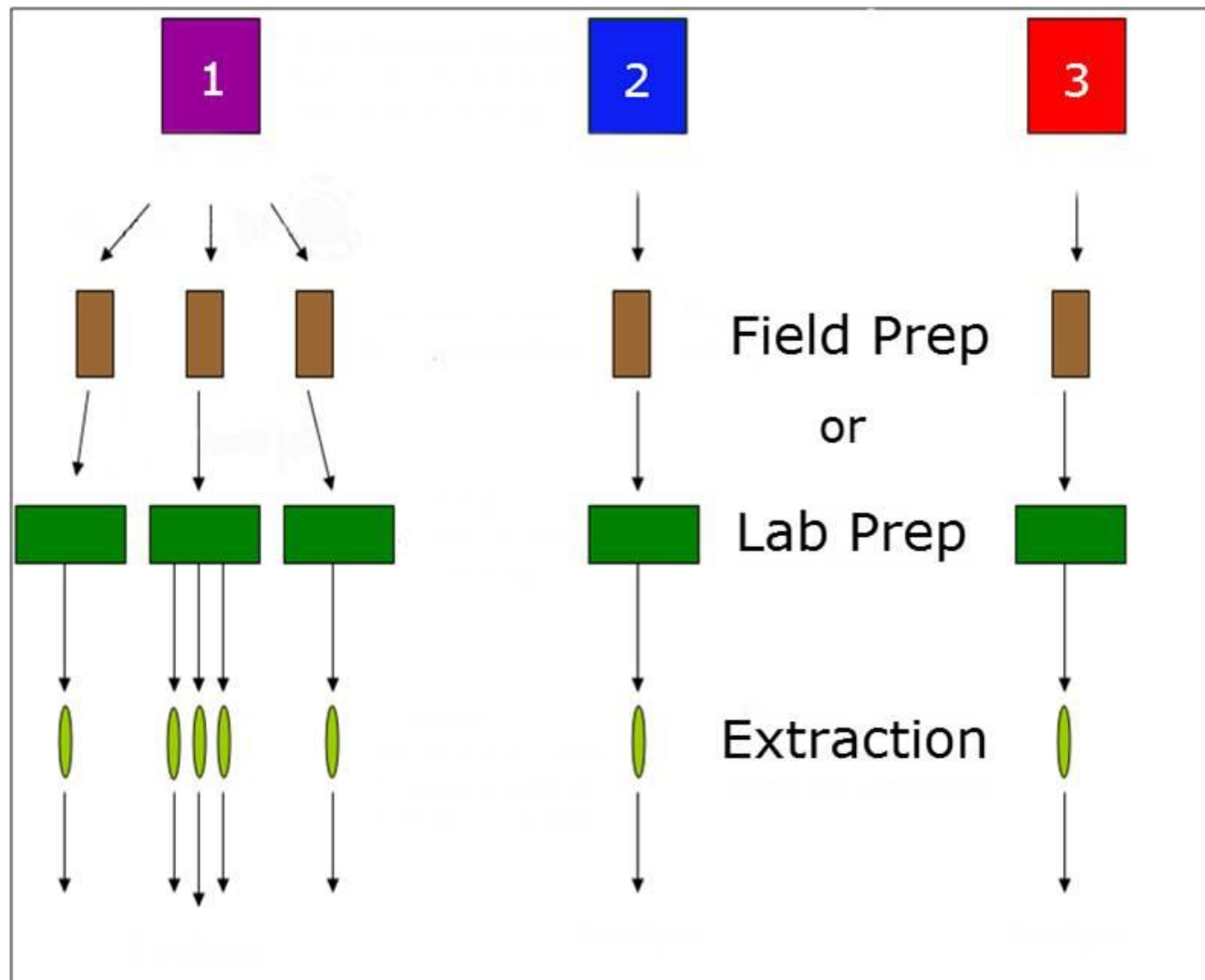


# Interpreting Error

- ▶ “Unacceptable” RSD
- ▶ Low RSD
- ▶ High RSD



# Isolating Sources of Error



# Making Decisions Using ISM Data

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